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ON THE TECTONICS OF THE MESO-CENOZOIC DEPRESSIONS OF SIBERIA AND THE FAR EAST

by Ye. D. Shyglin and A. B. Li

A conference on the tectonics of Siberia and the Far East took place in February at the Siberian Division of the Academy of Sciences, USSR, in Novosibirsk.

Representatives of the leading geologic organizations of Moscow, Siberia, the Far East, scientific workers of the Institute of Geology of the Earth, Academy of Sciences, USSR, the Institute of Geology and Processing of Fuel Resources, Academy of Sciences, USSR, VSEGEI, VNIGRI, Coal Laboratory, Academy of Sciences, USSR, VAGT, and also the territorial geographical directorates took part in the work of the conference.

The theme "Mesozoic and Cenozoic Structures of Siberia; Methods of their study, and Ways of Expressing Them on Tectonic Maps" was considered.

In all, over 50 papers were read.

The problem dedicated specifically to Meso-Cenozoic depressions up to the Chinese plain was considered at the conference, and also broader rational problems of tectonic regionalization of separate areas of Siberia and the Far East were considered.

In connection with the fact that the leading participants in the conference had an average qualifying age which was relatively low, the papers were distinguished with rather new material.

The author of this report could not reach the session on time and therefore, the introductory papers and the papers dedicated to the problem of study of the Meso-Cenozoic depressions of the Urals and the West-Siberian platform remained unheard.

The paper on tectonics of the Mesozoic depressions of Kazakhstan by I. I. Gorskiy and N. I. Leonenok, noted on the program, as well as a number of papers on the Far East, were not read.

As a whole, the conference was rewarding and far exceeded the limits of the proposed themes. Many readers were concerned with the problem of classification of the depressions (Yu. A. Kosygin, Yu. B. Ustinovskiy, M. G. Organov, Yu. A. Gromov, and others). A rather broad and wide range understanding of this terminology was evident. The classification of the depression by its structural specialities, by its geotectonic position, and by its age, etc., was proposed.

Several readers considered the depression as an element of a whole structural zone, giving it a quite broad interpretation and including not only the downfault in it but also the uplift.

There was a general supposition that the depression was characterized by a specific type of molasse formation. A broader determination of the downfault was given by M. S. Nagibina (Institute of Geology of the Earth, Academy of Sciences, USSR), who in part

described the structure of Eastern Transbaikalia as a broad complicated depression of Mesozoic time. This depression was formed on the Hercynian base and consists of joint trunk anticlines, a complicated paleozoic complex of rocks, separated by graben-synclines filled with Meso-Cenozoic indications.

The wide range of these deposits and the broad distribution of the coal bearing facies corresponds to our understanding of the lower molasse. The characteristic speciality of this depression is the development of specific magmatism, consisting of effusive and intrusive steps. An indicative note of the intrusive step is the development of intrusions of the hypabyssal type.

The Far East was divided by geologists into a number of depressions in which effusives play a basic role, since this has a place in the pre-Dzhugdzharsk and Bikin downfaults (V. A. Moralev and D. I. Gromov).

The papers on the Meso-Cenozoic depressions of China (M. I. Varentsov, G. Ye. Ryabukhin) had a significant interest for we Kazhakhstanites. Almost 50 percent of the area of Central China is taken up by the depressions. There are two types of depressions in China: internal platform depressions on a pre-paleozoic base, and typical intermontane depressions. The Tsungliao depression belongs to the first category, and is located in direct contact with the Union border, and in recent years, industrial supplies of fuel have been discovered within its limits.

The Dzhungarsk, Turfan, Tarim, Tsaidam, and other depressions belong to the second category. Special interest is placed in the idea of oil bearing deposits of the Tsaidam depression with an area of 200,000 sq km, at an altitude of 2800 meters. All of the Meso-Cenozoic depressions of China are characterized by an almost analogical lithological component of mixed rocks, composed primarily of continental sediments, identical to a cross-section of the Ili depression. Marine sediments as in the Ili depression are of paleogene age with very small accumulations located in the Dzhungarsk and Tarim depressions. However, the extent of accumulation in different depressions varies markedly. The maximum extent in the limits of the Dzhungarsk depression is of Mesozoic deposits which together with Permian deposits attain a thickness of 12 kilometers. The maximum extent in the Tsaidam depression is to 11 kilometers, and it belongs to Oligocene and Neocene facies, of which the Neocene is salt bearing. A characteristic speciality of the Tsaidam depression is the relative equality of distribution of structures. The number of visible structures is more than 100, from which, at present, 10 have been drilled into and have produced oil from Tertiary deposits, with an output ranging from a single ton to hundreds of tons.

The Dzhungarsk depression is more assymetrical. Adyrniy structures are located on the southern side. The northern side forms as a whole a monocline with a slope of 3° to 5°, broken by faults, although in places closely folded structures are noted. However, at

present, oil is produced from the monoclinal Jurassic zone where the oilbearing structures are marked by asphalt pits. Oil seeps appear in the arkose alluvium of granites. The monoclinal wing sometimes presents an unexpectedly sharp drop because of a movement of a block of the paleozoic basement. This depression, as is the case for all depressions on a paleozoic base, is characterized by a sharp geophysical anomaly because of the folded basement.

Of the several papers of a methodic character, concerning research into the Meso-Cenozoic depressions, an interesting one from our point of view was the paper by worker V. V. Zabolyuev of VNIGRI, on "News on the Tectonics of the Vilyuisk Sinekliz and its Connection with Ancient Structures." In it it was noted that the newest tectonics as a whole fillow the ancient tectonics, which appears quite well as a result of geomorphological analysis. From such examples the following is evident: 1. the appearance of antecedent portions of valleys, 2. study of the coefficient of sinuositites which in uplifted areas falls to 1:1, but in depressions increased markedly, attaining 2 to 2.5, 3. study of the characteristics of erosion of rivers and the appearance of remanants [ostantsov], 4. registration of the width of the valley breakdown. Broad alluvial terraces are developed along the zone of uplift.

The author in particular had to explain the appearance of ponding on the Lena river and the changes in its valley.

Doubtless, use of this method will allow one to detail the structure of the strongly enclosed Ili, Chui and other depressions.

The second part of the session was dedicated to the study of regional tectonics of different areas of Siberia and the Far East. Among the more interesting ones, we note the papers of Yu. M. Pushcharovskiy, "Tectonic Map of the Far East"; L. A. Snyatkov. "Tectonics of the Verkhoyansk -- Chukotsk Folded Areas"; V. N. Kraskil'nikov, [Tectonic Map of the Altai -- Sayan Area", etc. They all have a great significance for the tectonic understanding of the described areas.

We note especially two papers departing somewhat from the theme: A. A. Predtechenskiy, "On the Ancient Pre-Cambrian Uplifts of Southern Siberia", attempting to establish the concept of the "ancient darkness of Asia"; and N. P. Vasil'kovskiy, "On the Geologic Role of the Movement of the Level of the Oceans", giving a summary of suppositions by different authors on this question.

As a whole the output of the sessions of the Scientific Council of the Siberian Section of the Academy of Sciences of the USSR, allowed us to review contemporary factual material on the Meso-Cenozoic depressions of Siberia and the Far East. A direct practical deduction from this conference is the necessity of a complex investigation into the depressions along the line of discovering different resources, especially coal and oil.

In conjunction with this, great interest is directed to the depressions of the Far East, in the oil bearing relation, since industrial oil sources are noted in Mongolia and China.

This conference was important also from the point of view of the study of the Meso-Cenozoic depressions of southeastern Kazakhstan having a structure strikingly similar to those of neighboring oil-bearing depressions of China, which, it is true, differ to a great degree. Kazakhstan geologists have had a rather insignificant success in discovering oil and gas in these depressions; it is possible that this is explained to a certain degree by the point that the factor of force and area plays one of the important roles in the process of oil formation.

A DISCUSSION OF THE PROBLEM OF GEOTECTONICS AND THE ORGANIC WORLD

by N. L. Bublichenko, L. N. Rogotskaya and R. M. Fatkulin

The VI Session of the All-Union Paleontological Society, which took place in Leningrad, was dedicated to the theme of "Geotectonics and the Organic World."

More than 500 representatives of 128 institutions and organizations of 57 cities of the USSR participated in the session. Twenty-five papers were heard. From among Kazakhstan paleontologists came the report of K. F. Voinovskiy-Kriger on "The Use of Problematical Fossils in Differentiating True and Overturned Positions of Strata." The problem concerned the well known spirophiton -- a spiral shaped fossil, formed by the trace of movement of worms around one point -- the apex of a flat cone: it appears that this apex is always turned up from the bedding plane.

A report by Z. A. Maksimov was made on the character of trilobite casts. By the mutual position of the body shell with the tail shell and the head shell, it is sometimes possible to determine the upper surface of the bedding plane; thus, for instance, the discarded body and tail shells of the facopede lie in its life position, but the head shell is overturned.

O. S. Vyalov noted that in the Flysch deposits, bas-relief tides (negative) are always found on the lower side of the bedding plane.

A significant number of papers were dedicated to the changes of the organic world in conjunction with vertical fluctuating movements (V. G. Ochev, L. S. Glikman, G. L. Karmishina, and also L. I. Krasnyy, A. I. Damoida, A. M. Moiseeva, and T. A. Sikstil').

P. I. Puzanov and V. V. Stepanov produced most interesting information on fluctuating movements of the shoreline of the Black Sea (Pre-Dnestrov'ye) by data on changes of complexes of marine, lagoon-estuarian and other forms. Nevertheless, D. V. Nalivkin, entering into the discussion with example of the Azov Sea, showed that a freshwater fauna can change into a marine fauna by horizontal as well as vertical indications of a change in the water regime, without any participation of tectonic movements.

Noteable also was the general report of V. V. Stepanov that the thickness of beds of Mesozoic and Cenozoic rocks increases in the direction from the Ukrainian crystalline massif to the axis of the Black Sea depression.

The problem of reef formation in conjunction with the fluctuating movements was also reviewed at the conference (V. I. Dragunov, L. F. Shtein, V. Ye. Khain, D. V. Nalivkin); the coincidence of reefs to the line of breaks in the basement was noted; reefs grow in transition from the platform to the geosynclinal areas of the zone on the anticlinal uplift or on volcanic structures (atolls).

L. N. Kudrin spoke on differences in complexes of fauna in the arched portions and on the wings of consedimental folds.

A large paper was done by V. I. Lichkov, who brought up the problem more than once treated in literature, of the connection of periodic complex occurrences with geotectonic ones, and in such a way, with processes of the organic world; the paper evoked a lively discussion and also several objections.

The report of B. S. Sokolov on the All-China Stratigraphic Congress in Peking in 1955 deeply interested all. The problem of stratigraphy in China has attracted great attention -- following the regional conferences with participation of Soviet geologists, the All-China Stratigraphic Congress was called proceeding under the leadership of Li Su-kwan, Minister of Geology.

It is desirable to publish the work of the VI Session of the Society following the examples of previous years, since the problems brought forth in the session have considerable scientific interest.

THE ALL-UNION CONGRESS OF THE GEOGRAPHICAL SOCIETY

by S. Abdrakhmanov and A. V. Chigarkin

The Geographical Society of the USSR, organized 115 years ago, is one of the most important and oldest scientific societies, not only in our country, but also abroad. The activities of P. P. Semenov-Tyan Shanskiy, N. M. Przhevalskiy, N. N. Mikoykho-Maklaya, A. I. Boyekov, V. A. Obruchev, L. S. Berg, and many other world renouned explorers and travellers were closely connected with it.

The Geographic Society of the USSR has called a congress every five years since 1947. From 30 January to 7 February 1960, the usual Third Congress of the Geographical Society took place in Kiev.

From all ends of the Soviet Union about 650 delegates and guests come to the Congress. Intellectuals of Rumania, Bulgaria, Czechoslovakia, Hungary, Poland, Italy, Canaca, England, and the USA took part in the work of the Congress.

The Congress opened with festivities. It was opened with a short

introductory word by Ye. N. Pavlovskiy, president of the Society. He greeted the delegates and guests of the Congress and wished tham success in the work of the Congress.

After many greetings and announcements of congratulatory telegrams which had been sent to the Congress by polar explorers, Antarctic explorers, many scientific research organizations, and a number of foreign geographic societies, the Congress got down to work.

The report of S. V. Kalesnik, vice president of the Society, and correspondent member of the Academy of Sciences, USSR, "On the Activities of the Geographic Society of the USSR from 1955 to 1959," the paper of the revisionary committee of the Society, and also the paper of the President of the National Committee of Soviet Geographers, Academician I. P. Gerasimov, "On International Ties of Soviet Geographers" were heard.

Important problems standing before geographic science were discussed at the Congress; such problems as the role of geography in the discovery, use, preservation, and restoration of natural resources of the USSR; economic regionalization of the country for agricultural purposes; general theory and practical use of methods of landscape description; hydro-thermal regime of the earth's surface; the situation of geography in middle and higher schools in connection with the reforms of middle and higher education.

In contrast to the first two, the work of the Third Congress proceeded not in many sections but in previously listed problems. The number of participants was limited, the papers were published earlier, and given to the delegates. The basic point was made on a broad discussion of papers and speeches on symposia by problems. Such an order assisted in many ways the successful completion of the work of the Congress.

A leading place in the Congress was taken by the discussion of the problem "The Role of Geography in the Discovery, Use, Preservation, and Restoration of Natural Resources of the USSR." This is understandable, since natural resources of the country are the basic sources of its wealth.

As in known, natural resources are separated into inexhaustable (connected with sources of energy and material outside of the earth's surface), non-renewable (mineral raw materials and fuel), and exhaustable but renewable (timber, food resources, fertile soil). In connection with this, the vital problem of attaining a rational relationship between nature and the developing productive forces arose.

Work on study and economic evaluation of natural resources in the USSR is carried on with great success by many organs in our country. This led to a broad reflection in the Congress where papers dedicated to goals and problems of study and outlook of natural economic use of climate, hydrological, food, and timber resources of the USSR, the land fund, reserves of land animals, coordination of work on special cartography, etc., were read.

Together with the evident successes, existing shortcomings in

this important work were noted. In particular, the disassociation of study of natural resources between many departments, the lack of complexity in studies of natural resources, etc., were shown in the Congress. It was underlined that the basic problem of geographic science is the manifold and complex study of the basic types of renewable natural resources, evolution of methods of their evaluation, preservation, and restoration. The importance of the compilation of complex geographic atlases of separate republics and oblasts's (of the type of the recently published Atlas of the Byelorussian SSR and the Atlas of Kustanay Oblast, in preparation) which enables the economic evaluation of natural resources, was especially noted. At the same time it was stated that society must be enlisted into the work of preservation of natural resources.

The economic regionalization of our country is always one of the leading problems of geographic science. The compilation of any national economic perspective plan is unthinkable without territorial cross-sections, without dividing the country into important economic regions. The controlling figures of development of the national economy of the USSR from 1959 to 1965 underline the point that "the division of important economic geographic regions in planning allows correct geographic accommodation and a more economical territorial organization of the national economy of the USSR." In such a way the general economic regionalization of the USSR with its great practical meaning, deserves attention from Soviet geographers.

Thus it is not surprising that participants in the Congress heard with great interest papers on the problem of economic regionalization of the USSR. Papers on the contemporary situation of economic geographical research into the economic regionalization of the USSR, on the contemporary problems of economic regionalization of the USSR, on general economic regionalization of the USSR in the seven Year Plan, on the role of geography of population in the problem of regionalization of the USSR, on intra-oblast' regionalization, and also on the economic regionalization of the Ukrainian SSR were considered.

Discussion of the problems "Natural (physical geographic) Regionalization of the Country for Agricultural Use" aroused great interest. Papers dedicated to the physical geographic regionalization of the USSR for agriculture, soil-bioclimatic regionalization of the USSR, agroclimatic conditions of location and specialization of agricultural production, problems of cultivation in zones of the USSR, etc., were heard.

In recent years, landscape description has received broad developments of physical geography, forming the study of natural territorial complexes. Papers on the problem "General Theory and Practical Use of Methods of Landscape Description" received close attention of the delegates and guests of the Congress. Papers dedicated to the contemporary conditions of studies on landscape, landscape mapping, and the use of modern physical and chemical methods in studying the

landscape covering of the earth were heard at the Congress, covering this problem.

On the problem of "Hydro-thermal Regime of the Earth's Surface," papers on the thermal balance of the earth's surface, the water balance of the land surface, circulation of moisture and its role in natural processes, hydrothermal factors of soil formation, hydrothermal factors and ecology of vegetation covering, the regime of warmth and moisture, geographic zonalness, etc., were heard.

In all about 40 papers and 240 speeches on important problems of the geographic science were heard at the Congress.

At the final session of the Congress, large scale resolutions were undertaken in which the results of activity of the Geographic Society, Academy of Sciences USSR for five years were given and concrete problems of a still greater approach of geographic science to inquiries into the national economy were noted. The Congress also noted the abnormal situation, that up to now, in a number of large republics and particularly in Kazakhstan with its huge territory and differing natural conditions, there are no Geographic Institutes in the Republic Academies of Sciences. In its resolution, the Congress underlined the necessity of forming such institutes, in Kazakhstan first of all.

The election of leaders of organs took place. The new formation of the Learned Council of the Geographic Society of the USSR was selected. Academician Ye. N. Pavlovskiy was again selected as President of the Society.

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